GEOGRAPHIC NEWS BULLETINS

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Contents for Week of November 18, 1929. Vol. VIII. No. 18

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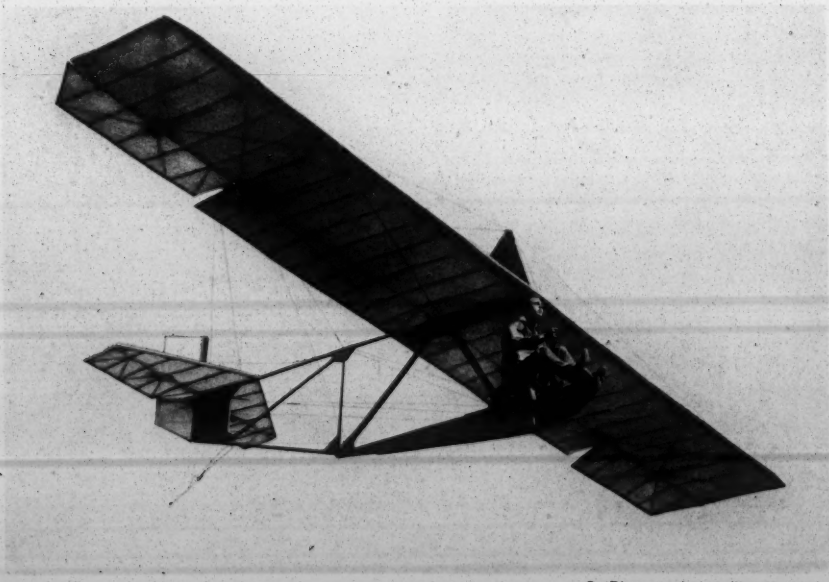

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ICARUS OF THE TWENTIETH CENTURY

(See Bulletin No. 4)

HOW TEACHERS MAY OBTAIN THE BULLETINS

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Tree-Ring Calendar Will Yield Dates of Early American Ruins

ONE of the world's most remarkable calendars nears completion.

It is a calendar of a people who had no written symbols and whose name is unknown. It records periods that passed hundreds of years before Columbus landed.

The calendar was not written by the people but by patient Nature, who adds rings to trees each year. The unique record consists of 5,000 cross-section slices of tree trunks and timbers.

Completion of the series has supplied the information which, within a few weeks, will enable scientists to fix the date when Pueblo Bonito, "America's first apartment house," and some forty other major pre-Columbian ruins in the American Southwest were built and occupied.

Near End of Scientific Detective Story

Study and codification of the 5,000 tree sections, including a series of cross sections located this summer after years of search, is being concluded by Neil M. Judd, leader of the National Geographic Society's Expeditions which revealed Pueblo Bonito, and by Dr. A. E. Douglass, leader of the timber and wooden beam research parties.

These scientists and their aids are about to write the final answer to a "scientific detective story" that has progressed through chapter after chapter until this summer's work culminated in finding the missing tree-ring links that spell the solution.

This solution will enable The Society to date the period when the complex and highly developed civilization of Chaco Canyon produced the Beautiful Village (Pueblo Bonito), a communal dwelling of some 2,500 people, centuries before the white man set foot on American soil. There this people, with no apparent communication with the Egyptians, Babylonians or Assyrians, constructed their masonry residence, equipped it with household utensils, furnished the ceremonial chambers, and wrought intricate jewelry of marvelous beauty.

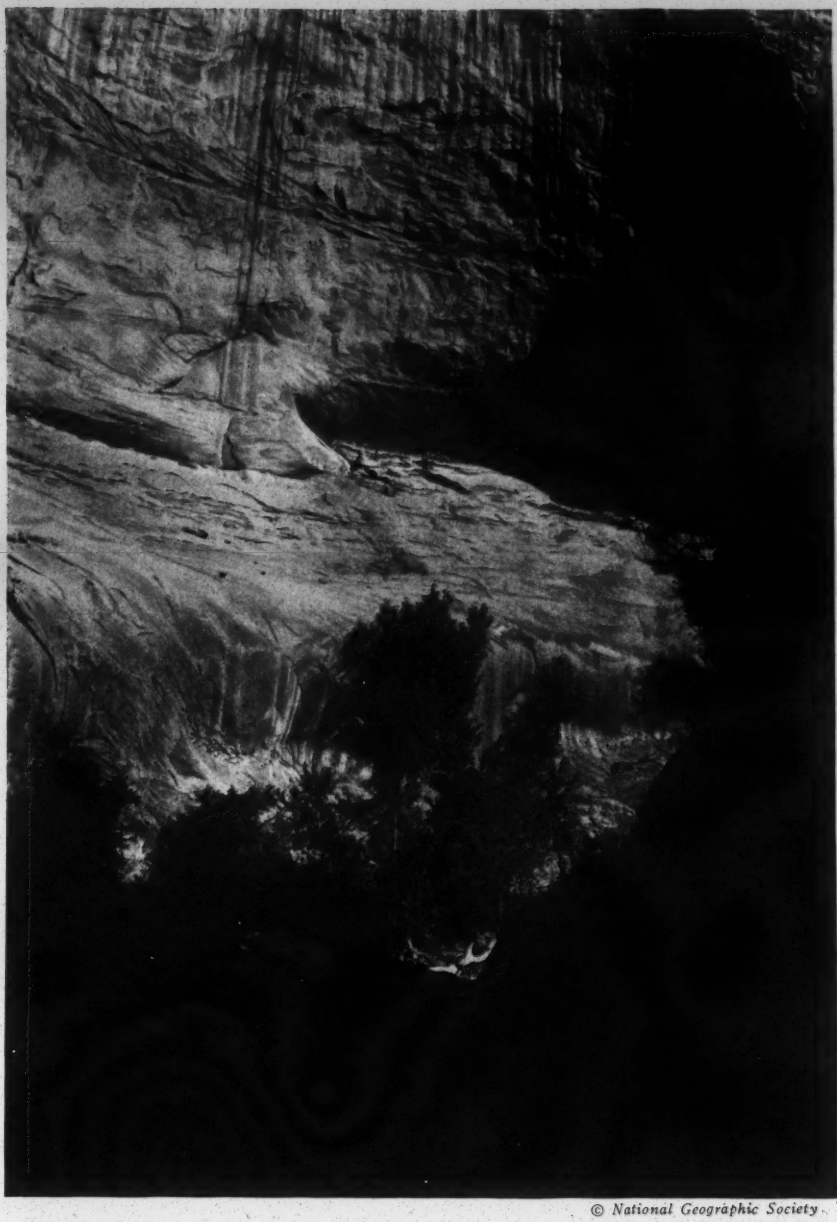
Rings Different for Different Years

These mementos of a civilization which rivaled those of the ancient Old World cultures, of which the Bonitans apparently knew nothing, have already been brought to Washington from year to year, and have been viewed by thousands and pictured in publications the world over.

But always there was the perplexing question about Pueblo Bonito, as about the other pre-Columbian ruins, "How old are they?"

Archeology, botany, geology, astronomy, micro-photography and plain "sleuthing" were brought to play to solve this scientific mystery. The trail led along the tree-rings patiently collected from sections cut in various parts of the Southwest, to be compared with similar rings found in the ancient wooden beams of Pueblo Bonito itself.

Years of painstaking research were based on the commonly known fact that tree growth deposits a ring for each year of the tree's life, and under a microscope each year's ring shows individual characteristics. Lean years or "fat" years, in terms of rainfall and consequent tree nourishment, are registered indelibly and unmistakably.



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CLIFF-DWELLERS OF THE SOUTHWEST LIVED LIKE SWALLOWS IN THE GREAT CLIFFS

Dwellings in an ancient ruin in Moki Canyon may be seen against the black shadows where Nature has left a deep gash in the canyon wall. When these buildings were erected and occupied has been a mystery. Completion of the tree-ring calendar by the National Geographic Society will give a key to the age of many ruins in the Southwest (See Bulletin No. 1).

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Map Puzzle: What Three West Coast Cities are Each "Nearest" New York?

THE U. S. Post Office Department wants to speed up the air mail.

Its studies on the problem will probably reopen questions of the shortest routes between the Atlantic and Pacific coasts.

At present three large West Coast cities are "closest" to New York.

San Francisco, Seattle, and Los Angeles are each nearest to Manhattan. It depends on how you travel.

Seattle Both Nearer and Farther

San Francisco is nearest New York by airplane routes.

Seattle is nearest by great circle measurement, and by railroad train.

Los Angeles is nearest by automobile road and by steamship.

Seattle is in a peculiar position. It is both nearer and farther from New York than either of its West Coast metropolitan neighbors. Few people make the 6,953-mile ocean journey to Seattle by way of Panama Canal. Few, if any, have flown the great circle route, the short cut from New York to the Pacific Coast.

All transatlantic flyers shape their courses on great circle routes, which take advantage of the roundness of the earth.

The advantage of a great circle route can be shown by an imaginary route from New York to Eureka, California. Both cities are on the same latitude; that is, they are the same distance from the North Pole. Chebanse, Illinois, is also on the same latitude, which is approximately 41 degrees. The distance from New York through Chebanse to Eureka along the 41st parallel of latitude is 3,622 miles. But this is not the shortest route to Eureka. A great circle route, New York to Eureka, taking advantage of the tapering of the earth toward the North Pole, is only 3,580 miles, 42 miles shorter than the latitude route. A short-cut great circle route to Eureka would run about 75 miles north of Chebanse, cutting through Wisconsin near Madison.

Great Circle Route to Seattle Goes into Canada

The great circle route from New York to Seattle runs near Elmira, and Buffalo, New York, Hamilton, Ontario, over Lake Michigan at Charlevoix, across northern Wisconsin, about 25 miles south of Duluth, near Minot, North Dakota, swinging up to within 25 miles of the Canadian border and finally rounding off the arc at Seattle 100 miles south of the border.

Airplanes, like railroad trains, do not go straight for their goals as the following comparison of the distances, in miles from New York, shows:

	By Present Airplane Routes	*By Great Circle Route*
Los Angeles	2,774	2,440
San Francisco	2,731	2,560
Seattle	3,433	2,385

Bulletin No. 2, November 18, 1929.

UMI

Therefore it follows that trees which have grown in the same region, and thus have been subjected to the same cycle of dry, normal or moist years, will show the same characteristics, and their timbers can be identified by comparison.

The life of a single tree in New Mexico will not span many centuries. But an old tree and a young tree, growing side by side, will register the same season records. Thus the young tree can be dated and will carry on the record for years after the older tree has fallen or has been cut for timber.

Hence the problem was to take the beams of Pueblo Bonito, and those of other ruins, and by matching the overlapping sections of one series with another until the record was linked up with sections of living trees, reconstruct the tree-ring calendar.

Had Worked Calendar Back to 1260 A.D.

When this season's work started the scientists were so near a solution that the lapse in their records was all the more baffling. They had worked back a chronology after years of patient study of old timbers and sections of living trees that gave them a calendar to 1260 A.D. They had established another chronology covering a pre-Columbian period of 586 years.

All so far proven was that Pueblo Bonito dated some time before 1260. To get exact dates it was necessary to dovetail the two chronologies. Is there a gap between? Or do they overlap?

Telegraphic advices to Dr. Gilbert Grosvenor, president of The Society, give assurance that the timber sections collected this summer are adequate to link the two calendars, and thus solve a major problem affecting most of the important pre-Columbian ruins of the Southwest.

Note: See also accounts of the National Geographic Society expedition's work at Pueblo Bonito in the *National Geographic Magazine*, June, 1921; March, 1922; July, 1923; September, 1925.

Bulletin No. 1, November 18, 1929.

© *Photograph by O. C. Havens*

A ZUNI WOMAN ROLLS CLAY COILS FOR POTTERY

The art of pottery-making in the Southwest has been handed down by the Indians from generation to generation for thousands of years. Each age, of course, has its own particular style of design and ornamentation. The study of these designs gives other clues to the period when the pueblos were occupied.

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Hankow: Important to Armies and Varnish Makers

WHO holds Hankow?

This question arises in almost every revolution that breaks out in China. Nothing so clearly reveals the importance of Hankow on the Yangtze as the value placed upon it by military leaders.

Armies converge on Hankow like steel shavings move toward a magnet.

Lying about 600 miles up the Yangtze, Hankow is as important geographically as Chicago. Hankow has only one railroad but the rivers and streams of China form commercial lanes through which products of nine provinces flow into the Hankow markets, while the port is equally important as a distributing point for foreign commerce destined for the interior.

Population of "Greater Hankow" Exceeds 1,500,000

Hankow occupies the north bank of the Yangtze where the Han pours its muddy torrent. On the opposite side of the Han lies Hanyang, and across the mile-wide Yangtze, Wuchang, the latter a venerable town which was flourishing when Hankow was a fishing hamlet. Both Hanyang and Wuchang now are a part of "Greater Hankow" with more than a million and a half inhabitants.

The Hankow river front is an amazing jumble of shipping. There are ungainly junks, but they move about the water in the hands of expert rivermen as easily as modern vessels in our busy harbors. Some of them, displaying rotten hulks with gaping holes above the water line, cause the traveler to wonder how they stay afloat, while now and then a huge, high-pooped craft, adorned with brightly painted carvings and plates that make it look like a floating circus wagon, edges its way shoreward.

Small sampans dart here and there propelled by the muscle-power of perspiring coolies whose families, under matting-covered awnings, fill the air along the shore with the singsong chatter of the Orient. It is estimated that 25,000 native boats ply in and out of Hankow and its sister cities. Meanwhile modern steamboats from lower Yangtze points come and go on schedule. Among these are American tankers taking on tung oil for American varnish and oilcloth makers.

Noise of Streets Strain Visitor's Eardrums

The walled city in the background also seethes with commercial activity to the tune of noises that strain the visitor's eardrums. Some of the narrow lanes are paved with flagstone while others are mere ruts. Nevertheless, they are the playgrounds of thousands of children.

The children yell at play; the venders cry out their wares; coolies, bearing heavy burdens, warn passersby to dodge their bulky loads; beggars groan and moan; and rickshaw boys, without regard to pedestrians, shout as they hurry their fares through the crush of humanity. The yells of carriers of wealthy Chinese, as they bear their dignified masters, can be heard above the din, and the traveler wonders if these men are not employed for the strength of their vocal cords.

But this is not all. Along the sidelines of the throng the merchants bicker in loud voices with prospective purchasers.

© *Photograph by Captain A. W. Stevens*

A LARGE OIL REFINERY AS THE TRANSCONTINENTAL AIR PILOT SEES IT

Ten miles east of Rawlins, Wyoming, on the New York-San Francisco route, pilot and passengers look down on Parco, where storage tanks and refineries have been built to handle oil from near-by wells.

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German School Boys Fly in Motorless Planes

NEW duration records with sail planes have been set up recently in the United States and in Germany.

One German flyer in a motorless plane stayed up fourteen hours.

A recent communication to the National Geographic Society by Howard Siepen describes this new chapter in man's conquest of the air.

"In Germany to-day hundreds of school boys are flying," the Society's correspondent writes. "Three thousand took official instructions in 1928. To understand fully the rise and amazing growth of Germany's gliding machines, one must look back—back to the pioneer makers of airplanes. The Wright Brothers, for example, and Lilienthal made their first aerial dashes in gliders. Then grew the idea of applying an engine with propeller to drive the glider.

Air Will Support Man as Water Will Support a Swimmer

"So successful have motor-driven aircraft become, however, that the world's attention has been largely diverted from air travel by simple gliders. For nearly two decades only a few enthusiasts kept the art alive; but to-day, due to amazing increase in air commerce, man is more interested than ever in the air as an element —in that soft, light, flexible medium through which his flying ships must sail.

"Already, from more recent adventures in gliding machines, it appears that man is coming to share what birds have always known about the air. He finds it will support him, as water carries a swimmer, if he will but handle his glider wings as soaring birds handle theirs. Even wind gusts, squalls, and clouds, which pioneer experimenters with gliders used to dread, are now recognized as useful aids to motorless flying craft.

"Between gliding and what they call 'sail flying' the Germans make a sharp distinction. During a glide the plane steadily loses altitude till it lands. A 'sail flight,' on the contrary, is one in which the machine, while pointing downward, is lifted by upward air currents, and thus either maintains or increases its elevation.

Wings Sometimes 59 Feet in Length

"For training a beginner in motorless flying the simple glider is used; but it is the sail plane which actually *flies*. In build, it is more sensitive than a simple glider and capable of responding to vertical air currents.

"Flying a plane with no motor in it seems less miraculous to the man on the ground when he hears how it is built. The conspicuous feature of the sail plane is its very long, narrow wings—sometimes as much as 59 feet in length and less than 5 feet in width. Narrow the wings must be, for broad ones would create too many eddies, and long they must be to provide the surface to lift a man's weight.

"While simple gliders often start merely by sliding or being dragged down a hillside, so light in structure is the sail plane that were it started slowly it would only tumble about like thistledown in the wind and get at once out of control. Hence, in launching, an elastic rope device is used, which shoots the plane into the air like a stone from a sling.

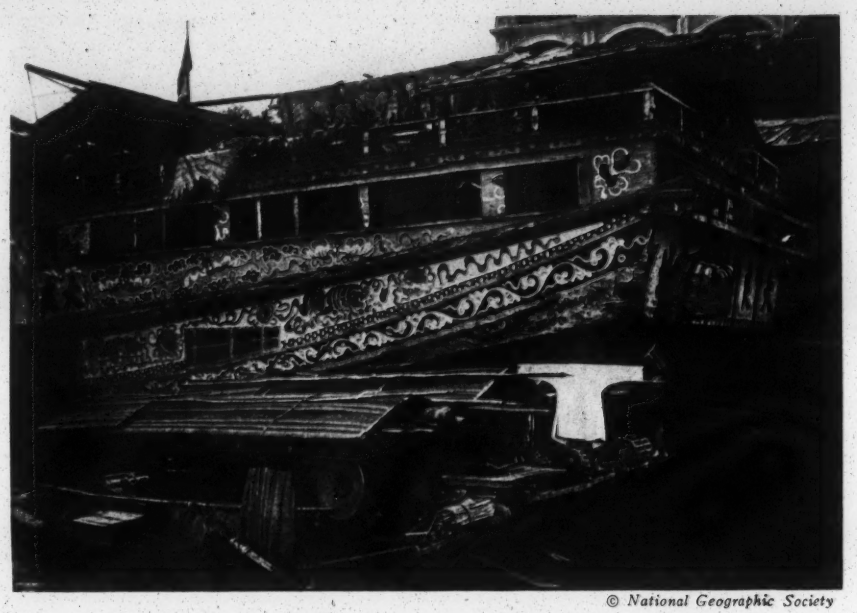
"The pilot must maintain this speed by pressing down the nose of the plane, which decreases the angle of the tilt of the wings. The earth's gravity will then

Sell Shop Signs as "Good Will"

To the foreigner, the pedestrians in their loose-fitting clothing look like pajama-clad citizens on parade, but the wearers are by no means ready to retire. Business in Hankow is almost a religion, and nearly every man seen on the street has to do with the enormous amount of commerce that flows through and past the port.

If a traveler knows the advertising code in Hankow, he can locate any type of business by reading the shapes and colors of the shop signs along the narrow thoroughfares. For instance, gold platers use salmon-colored boards with green characters. Druggists' boards are gilded. Black, gold, red and green are favorite colors. On each sign is a motto and when a store changes hands, the sign is valued somewhat the same as "good will" in the United States.

Bulletin No. 3, November 18, 1929.



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YANGTZE BOATS OFTEN LOOK LIKE FLOATING CIRCUS WAGONS

The colorful, elaborate decorations on this junk are, however, evidence of the boatman's affection for his craft. United States trade on the Yangtze is so extensive that the Government maintains gunboats specially designed to pass through the gorges above Hankow.

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Belfast: A Linen "Shop" Where America Spends Millions

THE visit to the United States by a delegation from Ireland inquiring into the American market for Irish linens and laces, turns attention to Belfast, the island's famous textile town.

Ocean-going ships of all kinds and sizes, always moving in and out of the harbor, and bulky vessels tied up at the docks on both sides of the Lagan River, are evidence of Belfast's commerce.

Flags represent every continent, while on the water-front streets British seamen mingle with sailors from the Orient, from North Africa, from both the Americas, and from the islands of the seas.

Largest Linen Factories of Ireland Operate in Belfast

Above the docks the cranes and other dock equipment, with their myriad cables and supports, etch a network against the Belfast skyline. The city claims the largest rope factory in the world; it has the largest Irish linen factories in Ireland. There, literally, are acres of linen works in the city.

Modern machinery hums in the linen factories, but hand looms may be found in operation here and there. Workmen, sitting on cross-beams before what appear to be crude weaving frames with hundreds of threads crossed and recrossed before them, skillfully weave damask for tablecloths that may grace dining tables of American homes. They weave 40 threads to a square inch and the finished product is so tightly woven that it will hold water. Linen worth $18,000,000 was shipped from Belfast factories to the United States in one year.

Import American Tobacco To Make Belfast "Twist"

Pretty Irish maidens stand beside long tables filled with Kentucky tobacco leaves in the tobacco factories. Here the product of the Kentucky tobacco fields is twisted into "ropes" about an inch in diameter, then wound on reels, compressed, and cooked by steam. The tobacco emerges from the factory as "twist," a favorite tobacco product among British tobacco users.

Mineral water bottling works and distilleries also give employment, but one of the city's greatest prides is its shipyards. The *Olympic, Adriatic, Belgenland* and many other well-known liners slid down the Belfast ways amid the cheers of the inhabitants of Belfast. So did the doomed *Titanic*.

Clean, wide streets bordered by fine government buildings, large parks and playgrounds and, in the business section, fine shops, mark Belfast. There also are fine residences with private gardens attached.

Site of City a Swamp Less Than 100 Years Ago

Ulster itself (Northern Ireland), if you would believe a Belfast Irishman, is a large garden with the hills and plains of County Donegal and County Antrim covered with forests and well-kept farms, here and there studded with picturesque villages and placid lakes. A Belfast guide likes to take visitors to Belvedere Gardens on the edge of the city where the panorama presents a vast area of fine farms not unlike the checkerboard farm valleys of eastern United States.

It now is difficult to imagine that Belfast's site was once a swamp and that less than a century ago no ocean-going ship could navigate the Lagan as far as the Northern Ireland capital. Before the sturdy men from the small villages came

draw the plane downward in a gently slanting line of flight, which is called a glide. Thus the gravity of the earth is the engine of the engineless airplane.

Ideal Sail Plane Yet To Be Made

"Speed, of course, is a prime factor in motorless flying; the faster the airman can glide, the quicker he can get from one vertical air column to the next.

"So then, speed, gliding figure, and sinking velocity are the three factors in the ideal sail plane. So far, the Germans have found it practically impossible to combine these three factors perfectly in any one plane. It is still a battle between the aerodynamical best and the technically possible.

"Germany's special interest in motorless flying has been attributed in part to the fact that under the original provisions of the Versailles Treaty certain restrictions were placed upon the nation's aircraft development; so that her air-minded students perforce turned to the study and development of engineless flight."

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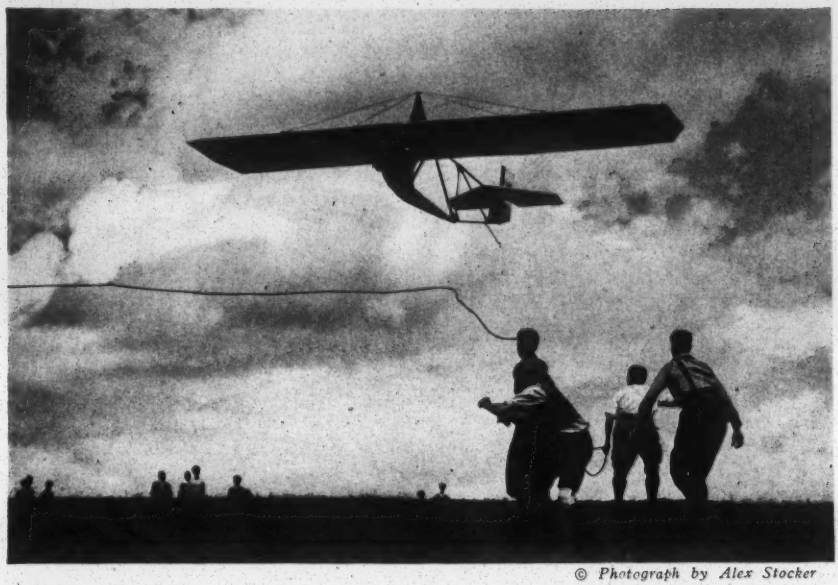

© Photograph by Alex Stocker

SNAPPED FORWARD BY THE ELASTIC ROPE, THE PLANE WHIZZES INTO THE AIR

The pilot must keep the nose of his plane down until he reaches the ground. By the singing of the air in the cables he can ascertain the position of his machine, for the more he nosedives the faster it will fly and the higher the note of singing. Starts that go straight up into the air may look very racy, but are extremely dangerous, because the plane is liable to slip backward.

to drain the swamps and plan the dredging of the channel, Belfast was subsidiary to Carrickfergus nearby. Now Belfast has a population nearly equal to that of Washington, D. C.; Carrickfergus has about 9,000.

Note: See "Ireland: The Rock Whence I Was Hewn," by Donn Byrne, 68 illustrations in black and white, 11 in color, *National Geographic Magazine*, March, 1927.

Bulletin No. 5, November 18, 1929.

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THESE BELFAST GIRLS WORK ON A KENTUCKY PRODUCT

They are making "twist" tobacco with leaves from America, mainly Kentucky. By means of this machine the tobacco can be twisted into ropes. "Twist" is used extensively in England.